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law of Nature, which determines the origin, duration, and ending of every form of animal life, by the operation of forces of which we can see dimly some disjointed fragments, but cannot hope to ever wholly comprehend.

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## THE LAND SNAILS OF NEW ENGLAND:

BY EDWARD S. MORSE.

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(Continued from page 414.)

THE following species belong to a group of small snails, whose thin polished shells furnish a distinguishing character. *Helix indentata*, described in the October number, belongs to this group. We promise that those who may have become interested in these papers will find the task of identification growing more and more difficult as we proceed, as with few exceptions the shells have very few distinguishing marks, and the differences are only prominent to those who make it a study.

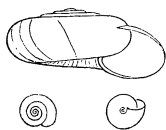
*HELIX CELLARIA* Müller. (Fig. 29.) The shell of this species is flattened; spire depressed, shining; whorls five, thickened within at the base; color pale horn, opaque white below. Diameter less than half an inch. Animal light indigo-blue, darker on head and tentacles. This species is not a native of this country. It has been imported from Europe to our shores through the medium of commerce. As these snails are generally confined to cellars and gardens, their eggs have probably been brought to this country on wine-casks or on the roots of hot-house plants. In a previous number we have dwelt on the extreme vitality possessed by the eggs of this family. A lady in Portland, in whose cellar



the writer collected a great many, stated that the snails annoyed her by crawling into her pans of milk. We can well imagine an enthusiastic collector delighted in being able to dredge specimens from the bottom of his coffee-cup at the breakfast table !

Another species, a true native however, though much resembling an English species, is *HELIX ARBOREA* Say.\*

Fig. 30.



(Fig. 30.) This is extremely common in New England, and there is hardly an old log by the roadside but that shelters them. The shell is thin, pellucid, polished, and of a brownish horn-color ; whorls four to five, slightly increasing in size. Umbilicus not large ; diameter about one-sixth of an inch, though occasionally larger.

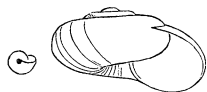
*HELIX ELECTRINA* Gould (Fig. 31) resembles the last species somewhat, being of the same size, though its color is darker, and the whorls rapidly enlarge. In this latter character it resembles *Helix indentata*, though differing from that species by its dark smoky horn-color, and its open umbilicus. It occurs in damper situations, oftentimes under leaves near stagnant pools of water.

Fig. 31.



*HELIX BINNEYANA* Morse (Fig. 32) resembles *H. indentata* very much, and has always been confounded with that species ; it differs in always having an open umbilicus, and the color is different, being a greenish white, while *H. indentata* is white, with a pinkish tinge. The differences are very marked in certain microscopical characters of the animal.

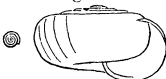
Fig. 32.



\*The smaller figures accompanying the cuts represent the natural size of the shell.

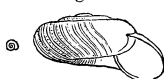
*HELIX MULTIDENTATA* *Binney*. (Fig. 33.) This is one of our most beautiful species. The shell is less than an eighth of an inch in diameter, the whorls are six, very closely revolving, and at the base of the shell within are seen two or more rows of teeth radiating from the umbilicus. The shell is of a very light horn-color, and the animal is often rosy white. It is extremely rare, having been found but sparingly in Maine, Vermont, New Hampshire, New York, and Ohio.

Fig. 33.



Another charming shell, when viewed under a microscope, is *HELIX EXIGUA* *Stimpson*. (Fig. 34.) The shell has four whorls, banded by numerous sharp ribs, and the spaces between marked with wavy lines running parallel to the whorls. The umbilicus is very wide, and the color of the shell a decided greenish white. Diameter about one-tenth of an inch. This species occurs in nearly all the Northern States; in some places quite commonly.

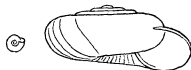
Fig. 34.



*HELIX MINUSCULA* *Binney*. (Fig. 35.) About the size of the last-named species, having four whorls; suture quite deep; umbilicus large; color white.

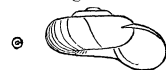
Fig. 35.

It is common in the West, but extremely rare in the Eastern States. It is said to be very common in grass in the gardens of Cincinnati, Ohio. Rev. E. C. Bolles has recently found a number of specimens in the State of Maine.



*HELIX MILIUM* *Morse* (Fig. 36) is a very minute species; the whorls rapidly enlarge; umbilicus quite large. The upper surface of the shell is reticulated by slightly raised ribs, and wavy revolving lines. The under surface is shiny; color greenish-white. Diameter one-twentieth

Fig. 36.



of an inch. This little species, first described by the writer from specimens found in Maine, has since been discovered in Massachusetts, and two specimens have recently been received from California, one from San Francisco, and the other from the Sierra Nevadas, showing an unusually wide distribution.

*HELIX FERREA* Morse (Fig. 37) is slightly larger than

Fig. 37.

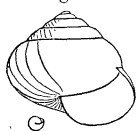


and New York.

*H. milium*, and has a steel-gray tinge, and an outline more like *H. electrina*. It has been found in Maine, Massachusetts,

*HELIX CHERSINA* Say. (Fig. 38.) A very characteristic species. The shell is conical, thin,

Fig. 38.

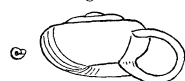


polished, amber-colored; extremely fragile. Whorls five to six, rounded. Base convex; aperture narrow; umbilicus absent. Diameter one-tenth of an inch. This species occurs in nearly all parts of the United States, and is quickly recognized by its turreted and fragile shell.

The shells of the following group are not smooth and polished as in the majority of those just described, but many of them are coarsely striated, and a few have reflected lips. They are all quite small, and variable in form, certain species having an elevated spire, while others are quite flattened. The denticles on the tongue are not claw-shaped as in those previously described, but are notched like a saw.\* All the species are very characteristic, and easily recognized.

*HELIX MINUTA* Say (Fig. 39) has a little white,

Fig. 39.



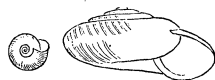
translucent shell, with four rounded whorls, the last one flaring at the aperture. Aperture nearly surrounded by a broad reflected lip. Umbilicus large. Diameter one-tenth

\*The tongue of a snail was described in the first number of this Magazine.

of an inch; animal whitish. This species is closely allied to *Helix pulchella*, of Europe, and by many authors is considered the same, though we believe them to be distinct. The two species have an extreme range through the northern hemisphere. It is found plentifully about old stone-walls in gardens, and in grass on banks of rivers.

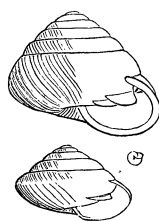
*HELIX STRIATELLA* *Anthony*. (Fig. 40.) Shell depressed, convex, thin; light horn-color. Whorls about four, with delicate oblique striae. Suture distinct; umbilicus very large; lip thin. Diameter less than one-fourth of an inch. Animal lightish-blue above, with brownish dots. Creeping disk yellowish white. Occurs throughout the Northern States; very common in New England in hard-wood growths, and under chips and logs by the country roadside. The shell is quickly recognized by its satin lustre, and the distinct striations upon its surface.

Fig. 40.



*HELIX LABYRINTHICA* *Say*. (Figs. 41, 42.) Shell minute, conic, apex obtuse; brownish horn-color. Suture distinct; whorls six, with well-marked ribs following the lines of growth. Lip thickened, reflected; base flat; umbilicus small. Within the aperture are six revolving ribs, terminating some ways within the aperture. Three of these are on the body whorl, one on the umbilicus region, and two at the base of the aperture. Under the microscope, the three ribs on the body whorl are seen to be armed at intervals with numerous sharp-pointed processes, pointing towards the aperture. Diameter of shell one-tenth of an inch. Animal bluish black. Found in nearly every State in the Union.

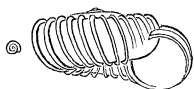
Figs. 41, 42.



This is a very characteristic species, in outline similar to *Helix chersina* described above, though differing in the coarse ribs, the reflected lip, and the peculiar teeth within the shell. The young shell (Fig. 42) is quite flat, with the outer whorl sharp.

*HELIX ASTERISCUS Morse.* (Fig. 43.) Shell minute, having four rounded whorls banded by twenty-five to thirty thin transparent prominent ribs.

Fig. 43.



Spire flat; suture deeply impressed; lip sharp. Umbilicus quite large; color light-brown. Diameter one-sixteenth of an inch; animal bluish-white. This little species, first discovered in Maine by the writer, has since been found on the Hudson River, N. Y.; on the northern shores of Lake Superior; Gaspé, C. E.; and in the vicinity of Salem, Mass. Rev. E. C. Bolles has found it plentifully near Portland. It is a rare shell, and seems confined to wet and boggy ground, where spruce and pine is intermixed with alder.

*HELIX LINEATA Say.* (Fig. 44.) Shell very small, discoidal, light greenish in color. Whorls four, equally visible on both sides of the shell, having

Fig. 44.



a series of raised lines revolving with the whorls. Umbilicus wide; aperture narrow, on the outer wall of which are two pairs of minute white teeth, one pair more remote. Diameter one-eighth of an inch; animal white, thread-like. Inhabits all the Northern States, though not common in the West. In New England, a very common species along country roadsides.

*HELIX MINUTISSIMA Lea.* (Fig. 45.) This is the smallest land shell in the country, measuring only six-hundredths of an inch. The shell is subglobose, spire

slightly elevated; below convex; umbilicus large; suture impressed; whorls four; lip sharp; color light brown. First discovered in Cincinnati, Ohio, and since found in various places throughout New England. This species is not uncommon, though owing to its extreme minuteness is not often found. The writer has separated this into a distinct genus, from the fact that the jaw is composed of sixteen distinct pieces, and not one solid plate, as in other snails. For reasons already given, the species are described under their old generic names.—*To be continued.*

Fig. 45.



## REVIEWS.

ENUMERATION OF HAWAIIAN PLANTS. By *Horace Mann*. (From the Proceedings of the American Academy of Arts and Sciences, Vol. VII., 1866.) Cambridge, July, 1867. 8vo. pp. 92.

The collection which forms the basis of this enumeration was made during a visit of over a year to the Hawaiian Islands. The enumeration, consisting of a list of the entire known flora of land-plants, with descriptions of new genera and species, is prefaced by a sketch of previous botanical explorations in these islands, with a description of the physical geography of the five islands visited by the author, and remarks on the distribution of the plants, which latter depends on the distribution of heat and moisture, and the elevation of the soil. The wet region of Hawaii, for example, extending on the eastern side of the island, from a height of 1,500 or 2,000 feet, to about 5,000 feet,\* is the most heavily wooded of the group. The parts between 1,500 feet and

\* "The summits of West Maui, Oahu, and Kauai, lying between the heights of 4,000 and 6,500 feet, are just in the cloud level, and, being also peaks where denudation has long been active, the soil has become somewhat impervious to moisture, which therefore remains on the surface. The region has a peculiar aspect, which is at once recognized in ascending the mountains. The only forest-tree, the ohia lehua (*Metrosideros polymorpha*) becomes stunted; the trunks are covered with a thick coating of *Mosses* and *Hepaticae*, which retains the moisture so as to render everything dripping wet; and not more than a dozen species of flowering plants and ferns occur in the whole. Above this, on the mountains of West Maui and Kauai, there is an open tract, where the lehua, one of the largest forest-trees at an elevation of 2,000 feet, has become dwarfed, a foot or two high, in spreading clumps, but still flowing luxuriantly. In the midst of such clumps are found the violets peculiar to these regions, and in the neighboring tussocks of sedge (an *Oreobolus*) are found the few other plants, which occur here and nowhere else, to the number of eight or nine; also *Drosera longifolia*, thousands of miles from its next nearest known habitat."